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(Incorporated 1918.)

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BY
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THE INSTITUTION OF MECHANICAL ENGINEERS.
THE INSTITUTION OF NAVAL ARCHITECTS.
THE IRON AND STEEL INSTITUTE.
THE INSTITUTION OF ELECTRICAL ENGINEERS.

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BRITISH STANDARD SPECIFICATION

FOR DIMENSIONS OF

INSULATED ANNEALED COPPER CONDUCTORS

FOR

ELECTRIC POWER AND LIGHT,

INCLUDING

PRESSURE TESTS.

(REVISED JULY, 1919.)

(This Specification does not deal with the composition, quality or durability of the insulating material used as the dielectric.)

LONDON:
PUBLISHED FOR THE ASSOCIATION BY CROSBY LOCKWOOD & SON,
7, STATIONERS' HALL COURT, LUDGATE HILL, E.C. 4, AND 5, BROADWAY, LONDON, S.W. 1,
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NOTE.—*The Association desires to call attention to the fact that this Specification is intended to include the technical provisions necessary for the supply of material herein referred to, but does not purport to comprise all the necessary provisions of a contract.*

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STANDARDS.

International Standards of Resistance for Copper.

1. The following Standards fixed by the International Electrotechnical Commission have been taken as normal values for Standard Annealed Copper :—

(i) At a temperature of 20° C. the resistance of a wire of Standard Annealed Copper one metre in length and of a uniform section of one square millimetre is 1/58 ohm. (0·017241 . . . . ohm.).

(ii) At a temperature of 20° C. the density of Standard Annealed Copper is 8·89 grammes per cubic centimetre.

(iii) At a temperature of 20° C. the "constant-mass" temperature co-efficient of resistance of Standard Annealed Copper, measured between two potential points rigidly fixed to the wire, is 0·00393 = 1/254·45 . . . per degree Centigrade.

(iv) As a consequence, it follows from (i) and (ii) that at a temperature of 20° C. the resistance of a wire of Standard Annealed Copper of uniform section one metre in length and weighing one gramme is (1/58) x 8·89 = 0·15328 . . . ohm.

Co-efficient of Linear Expansion of Standard Annealed Copper.

2. The co-efficient of linear expansion of Standard Annealed Copper, between 60° F. (15·6° C.) and 68° F. (20° C.), has been taken as 0·00000944 per ° F. (0·0000170 per 1° C.).

Density of Standard Annealed Copper at 60° F.

3. The density of Standard Annealed Copper at a temperature of 60° F. has been taken as 8·892015, and the weight of one cubic foot of copper as 555·1108 lbs.

Resistance of a Solid Conductor at 60° F.

4. For the purpose of calculating the tables, the resistance of a solid conductor of Standard Annealed Copper at 60° F., 1,000 yards in length, and of a uniform cross-sectional area of one square inch, has been taken as 0·0240079 ohm.

Constants for Converting Values from British to Metric Measures.

5. The following constants, being the Board of Trade legal values, are adopted throughout this Specification :—

(*a*) One inch = 2·54 centimetres.

(*b*) One pound = 453·592 grammes.

"Constant-mass" Temperature Co-efficient at 60° F.

6. At a temperature of 60° F. the "constant-mass" temperature co-efficient of resistance of Standard Annealed Copper, measured between two potential points rigidly fixed to the wire, has been taken as 0·0022221 = 1/450·025 . . . per degree F.

DEFINITIONS.

Definition of Solid Conductor.

7. (*a*) The term "solid conductor" denotes a conductor composed of one circular wire.

Definition of Stranded Conductor.

(*b*) The term "stranded conductor" denotes a conductor consisting of three or more circular wires laid up or twisted together to form one conductor.

Definition of Plain Conductor.

(*c*) The term "plain conductor" denotes a conductor consisting of copper only.

Definition of Tinned Conductor.

(*d*) The term "tinned conductor" denotes a conductor consisting of copper, the wire or wires of which are covered with a thin layer of tin.

Definition of Cable.

8. The term "cable" denotes one or more conductors with dielectric covering, and with or without protective covering.

Definition of Dielectric.

9. The term "dielectric" denotes that portion of the cable which is relied upon to insulate the conductor.

Definition of Lay.

10. The term "lay" denotes the pitch of the helix formed by any individual wire in a stranded conductor or of any individual core in a multicore cable.

Definition of Tolerance.

11. The term "tolerance" denotes the difference in magnitude from the magnitude prescribed in order to allow for unavoidable variations of material and workmanship.

STANDARD SIZES.

For the purposes of this specification an increase of 2 per cent. in the length of each wire in the stranded conductor, except the centre wire, has been assumed to allow for the laying up of the wires; the resistance has been calculated upon the assumption that the individual wires are practically insulated from each other, and the area of the stranded conductor has been taken to be the area of the solid wire which has the same resistance as the stranded conductor.

An increase of 2 per cent. on the resistance of a straight core of the same length is taken in the case of the cores in multicore cables, to allow for the laying up of the cores.

Sizes of Standard Circular Copper Wires.

12. The sizes, weights, and resistances of Standard Circular Copper Wires used for solid and stranded conductors shall be in accordance with the values given in Table 1.

Sizes of Standard Solid and Stranded Circular Conductors.

13. The sizes, weights, and resistances of Standard Solid and Stranded Circular Conductors shall be in accordance with the values given in Table 2.

In Table 2 the areas, weights, and resistances of the stranded conductors have been calculated by multiplying the corresponding values for one of the single wires of which the stranded conductor is composed by the constants set out in Table A as follows:—

TABLE A.

Number of Wires Stranded.	Constant.		
	Area.	Weight.	Resistance.
3	2·94118	3·06000	0·340000
7	6·88235	7·12000	0·145299
19	18·6471	19·3600	0·0536278
37	36·2941	37·7200	0·0275527
61	59·8235	62·2000	0·0167158
91	89·2353	92·8000	0·0112063
127	124·529	129·520	0·00803023
169	165·706	172·360	0·00603479

Standard Sizes of Conductors for Flexible Cords.

14. The number of wires of 0·0076 inch nominal diameter in flexible cords, and the Standard nominal areas and resistances of the conductors shall be in accordance with the values given in Table 3.

Standard Sizes of Conductors for Flexible Cables.

15. The number of wires and the diameter of each wire in flexible cables, and the Standard nominal areas and resistances of the conductors shall be in accordance with the values given in Table 4.

Tolerances on the Standard Weight and Resistance of Conductors.

16. Tolerances of the values shown in Table B below shall be permitted on the standard weight and resistance of conductors.

TABLE B.

Conductors.	Tolerance per cent.	
	Weight.	Resistance.
	+ or −	+ or −
SOLID (and annular conductors of Concentric Cables) :—		
Plain	3	3
Tinned, 0·036 inch diameter and over	3	4
Tinned, below 0·036 inch diameter .	3	5
STRANDED :—		
Plain	2	2
Tinned, 0·036 inch diameter and over	2	3
Tinned, below 0·036 inch diameter .	2	4

The values corresponding with the tolerances shown above are given in Tables 1 and 2.

NOTE.—*Hard drawn copper.*—The resistance of hard drawn copper conductors may be taken to be approximately 3 per cent. higher than that shown in the Tables for Standard Annealed Copper, but the exact figure varies with the actual size of the wire and with the elongation at the breaking load.

Variation of Resistance with Temperature.

17. (*a*) The values of the resistance, which shall be adopted at various temperatures between 40° F. (4·4° C.) and 120° F. (48·9° C.), of a solid conductor of Standard Annealed Copper, the length and cross-sectional area of which, at 60° F. (15·6° C.), are 1,000 yards and one square inch respectively, are given in column 2 of Table C below.

(*b*) The constant and its reciprocal, which shall be used to convert the resistance at a temperature T° to the Standard temperature 60° F. (15·6° C.) are given in columns 3 and 4 respectively of Table C below :—

TABLE C.*

1	2	3	4
Temperature. °F.	Resistance, at the temperature given in column 1, of a conductor the length and cross-sectional area of which, at 60° F., are 1,000 yards and 1 square inch, respectively.	Multiplier Constant.	Reciprocal of Constant.
	Ohm.		
40	0·02294	1·0465	0·9556
41	0·02299	1·0441	0·9578
42	0·02305	1·0417	0·9600
43	0·02310	1·0393	0·9622
44	0·02315	1·0369	0·9644
45	0·02321	1·0345	0·9667
46	0·02326	1·0321	0·9689
47	0·02331	1·0297	0·9711
48	0·02337	1·0274	0·9733
49	0·02342	1·0251	0·9756
50	0·02347	1·0227	0·9778
51	0·02353	1·0204	0·9800
52	0·02358	1·0181	0·9822
53	0·02363	1·0158	0·9844
54	0·02369	1·0135	0·9867
55	0·02374	1·0112	0·9889
56	0·02379	1·0090	0·9911
57	0·02385	1·0067	0·9933
58	0·02390	1·0045	0·9956
59	0·02395	1·0022	0·9978
60	0·02401	1·0000	1·0000
61	0·02406	0·9978	1·0022
62	0·02411	0·9956	1·0044
63	0·02417	0·9934	1·0067

* The values given in Table C have been calculated to six significant figures and rounded off.

TABLE C—*continued.*

1	2	3	4
Temperature. °F.	Resistance, at the temperature given in column 1, of a conductor the length and cross-sectional area of which, at 60° F., are 1,000 yards and 1 square inch, respectively.	Multiplier Constant.	Reciprocal of Constant.
	Ohm.		
64	0·02422	0·9912	1·0089
65	0·02427	0·9890	1·0111
66	0·02433	0·9868	1·0133
67	0·02438	0·9847	1·0156
68	0·02443	0·9825	1·0178
69	0·02449	0·9804	1·0200
70	0·02454	0·9783	1·0222
71	0·02459	0·9761	1·0244
72	0·02465	0·9740	1·0267
73	0·02470	0·9719	1·0289
74	0·02475	0·9698	1·0311
75	0·02481	0·9677	1·0333
76	0·02486	0·9657	1·0356
77	0·02491	0·9636	1·0378
78	0·02497	0·9615	1·0400
79	0·02502	0·9595	1·0422
80	0·02507	0·9574	1·0444
81	0·02513	0·9554	1·0467
82	0·02518	0·9534	1·0489
83	0·02523	0·9514	1·0511
84	0·02529	0·9494	1·0533
85	0·02534	0·9474	1·0556
86	0·02539	0·9454	1·0578
87	0·02545	0·9434	1·0600
88	0·02550	0·9414	1·0622
89	0·02555	0·9395	1·0644
90	0·02561	0·9375	1·0667
91	0·02566	0·9356	1·0689
92	0·02572	0·9336	1·0711
93	0·02577	0·9317	1·0733
94	0·02582	0·9298	1·0756
95	0·02588	0·9278	1·0778
96	0·02593	0·9259	1·0800
97	0·02598	0·9240	1·0822
98	0·02604	0·9221	1·0844
99	0·02609	0·9202	1·0867

TABLE C—*continued.*

1	2	3	4
Temperature. °F.	Resistance, at the temperature given in column 1, of a conductor the length and cross-sectional area of which, at 60° F., are 1,000 yards and 1 square inch, respectively.	Multiplier Constant.	Reciprocal of Constant.
	Ohm.		
100	0·02614	0·9184	1·0889
101	0·02620	0·9165	1·0911
102	0·02625	0·9146	1·0933
103	0·02630	0·9128	1·0956
104	0·02636	0·9109	1·0978
105	0·02641	0·9091	1·1000
106	0·02646	0·9073	1·1022
107	0·02652	0·9054	1·1044
108	0·02657	0·9036	1·1067
109	0·02662	0·9018	1·1089
110	0·02668	0·9000	1·1111
111	0·02673	0·8982	1·1133
112	0·02678	0·8964	1·1155
113	0·02684	0·8946	1·1178
114	0·02689	0·8929	1·1200
115	0·02694	0·8911	1·1222
116	0·02700	0·8893	1·1244
117	0·02705	0·8876	1·1267
118	0·02710	0·8858	1·1289
119	0·02716	0·8841	1·1311
120	0·02721	0·8824	1·1333

NOTE.—Given the resistance of a wire at T°, the resistance at 60° F. (15·6° C.) is found by multiplying the resistance at T° by the constant, given in column 3, for T°. Conversely, given the resistance at 60° F. (15·6° C.), the resistance at T° is found by multiplying the resistance at 60° F. (15·6° C.) by the reciprocal, given in column 4, for T°.

DIELECTRIC.

Paper Insulated Cables.

18. The Standard thicknesses of the dielectric for cables insulated with paper shall be in accordance with the values given in Tables 5, 6, 7, 8, 9 and 10.

The values in the Tables are calculated upon the basis that the distance between the conductors, or between the conductors and the nearest metal sheath, is in each case the thickness of the dielectric.

Jute Insulated Cables.

19. The Standard thicknesses of the dielectric for cables insulated with jute shall be in accordance with Table 5.

The values in the Table are calculated upon the basis that the distance between the conductors, or between the conductors and the nearest metal sheath, is in each case the thickness of the dielectric.

Tolerance on the Standard Thickness of Paper or Jute.

20. The maximum variation in the thickness of the dielectric at any point shall be not more than 10 per cent. below the standard thickness given in the Tables; and the mean of the thicknesses measured at equidistant points around the circumference shall be not less than the standard value.

Vulcanised Rubber Insulated Cables.

21. The Standard thicknesses of the dielectric for cables insulated with vulcanised rubber shall be in accordance with the values given in Tables 11, 12, 13, 14, 15, 16 and 17.

The values in the Tables are calculated upon the basis that the distance between the conductor and the exterior of the rubber is in each case the thickness of the dielectric.

Tolerance on the Standard Thickness of the Vulcanised Rubber.

22. The maximum variation in the thickness of the dielectric at any point shall be not more than 10 per cent. below the standard thickness given in the Tables; and the mean of the thicknesses measured at equidistant points around the circumference shall be not less than the standard value

LEAD SHEATHING.

Thickness of Lead.

23. The Standard thicknesses of the lead sheathing shall be in accordance with the values given in the appropriate table.

Tolerance on the Standard Thickness of Lead.

24. The maximum variation in the thickness of the lead at any point shall be not more than 10 per cent. below the standard thickness given in the Tables; and the mean of the thicknesses measured at equidistant points around the circumference shall be not less than the standard value.

ARMOURING, BEDDING, BRAIDING AND SERVING.

Armouring.

25. The armouring on cables, having a diameter not exceeding 0·5 inch (exclusive of bedding), shall consist of galvanised steel wires. The armouring on cables, having a diameter exceeding 0·5 inch (exclusive of bedding), shall consist of either galvanised steel wires or two layers of steel tape.

When the cable is armoured with double wires, the outer layer of wires shall be applied in the reverse direction to the inner layer.

The sizes of the galvanised steel wires for single wire armouring shall be in accordance with the values given in Table 18. The sizes of the galvanised steel wires for double wire armouring shall be in accordance with the values given in Table 19. The thicknesses of the steel tape shall be in accordance with the values given in Table 20.

Bedding.

26. The Standard thicknesses of the bedding measured before the armouring is applied shall be in accordance with the values given in Tables 18, 19 and 20. The diameter of the cable below the armouring or bedding shall be used in determining the thickness of bedding or serving both under and over the armouring.

Overall Braiding and Serving.

27. The Standard thicknesses of the overall braiding and serving shall be in accordance with the values given in Table 21. The diameter of the cable below the bedding, or below the armouring when there is no bedding, shall be used in determining the thickness of braiding or serving.

TESTS.

Measurement of Thickness of Dielectric.

28. The thickness of the dielectric shall be determined by measurements made on the surface of a carefully prepared section of the cable taken not less than twelve inches from the end of a factory length; and the cable shall be made approximately straight before being cut.

Measurement of Thickness of Lead.

29. The thickness of the lead shall be determined by measurements made on a circumferential strip carefully cut from the cable, and taken not less than twelve inches from the end of a factory length; and the strip shall be opened out and made approximately flat in such a manner so as not to reduce sensibly the thickness of the lead before measuring.

Bending Test.

30. If specified, a bending test shall be made on a sample of cable with open ends; and the length of the sample shall be sixty times the overall diameter of the cable. The sample shall be bent around the barrel of a drum three times in one direction, alternating with three times in the opposite direction, the diameter of the barrel being twelve times the external diameter of the finished cable. The length of cable shall then withstand the pressure test specified in Clause 31 of this Specification.

Pressure Test.

31. The pressure test shall be carried out with alternating current approximately of sine wave form at any frequency between 25 and 100 periods per second; and the R.M.S. value of the pressure shall be that stated in the appropriate table. The pressure shall be applied gradually, and maintained continuously at the full pressure for fifteen minutes between conductors and between each conductor and earth.

Unless otherwise specified, the pressure test shall be made after twenty-four hours immersion in water at the Maker's Works.

Earthed System.

32. A system shall be considered as an earthed system only when it is permanently connected to earth in such a manner that the total earth resistance does not exceed 2 ohms, or when a device is installed which automatically and instantly cuts out any part of the system which becomes accidentally earthed.

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,, 4.—SIZES NO. OF WIRES AND RESISTANCES OF CONDUCTORS FOR FLEXIBLE CABLES 19

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TABLE 5.—Working Pressure.— 660 volts. Dielectric.—Paper or Jute ... 20

,, 6. ,, ,, 2,200 ,, ,, Paper 21

,, 7. ,, ,, 3,300 ,, ,, Paper 22

,, 8. ,, ,, 5,500 ,, ,, Paper 23

,, 9. ,, ,, 6,600 ,, ,, Paper 24

,, 10. ,, ,, 11,000 ,, ,, Paper 25

,, 11. ,, ,, {250 D.C. ,, / 500 A.C. (3 phase)} ,, Rubber 26

,, 12. ,, ,, 660 volts. ,, Rubber 27

,, 13. ,, ,, 2,200 ,, ,, Rubber 28

,, 14. ,, ,, 3,300 ,, ,, Rubber 29

,, 15. ,, ,, 5,500 ,, ,, Rubber 30

,, 16. ,, ,, 6,600 ,, ,, Rubber 31

,, 17. ,, ,, 11,000 ,, ,, Rubber 32

British Standard Thicknesses of Armouring, Bedding, Braiding and Serving.

TABLE 18.—SIZES OF GALVANISED WIRES AND THICKNESSES OF BEDDING FOR SINGLE WIRE ARMOURING 33

,, 19.—SIZES OF GALVANISED WIRES AND THICKNESSES OF BEDDING FOR DOUBLE WIRE ARMOURING 33

,, 20.—THICKNESSES OF STEEL TAPE AND BEDDING 33

,, 21.—THICKNESSES OF OVERALL BRAIDING AND SERVING 33

TABLE 1.

CIRCULAR WIRES.

(STANDARD ANNEALED COPPER.)

1	2	3	4	5	6	7	8	9	10	11	12
Diameter at 60° F.			Calculated Area.	Weight per 1,000 yards.			Resistance per 1,000 yards at 60° F.			Resistance per 1,000 yards at 20° C.	Diameter at 60° F.
Standard.	Minimum Allowable.	Maximum Allowable.		Standard	Minimum Allowable.	Maximum Allowable.	Standard.	Maximum Allowable for Plain Wires.	Maximum Allowable for Tinned Wires.	Standard.	Standard.
Inch.	Inch.	Inch.	Sq. in.	lbs.	lbs.	lbs.	Ohms.	Ohms.	Ohms.	Ohms.	Inch.
0·0076	0·007485	0·007713	0·00004536	0·5246	0·5089	0·5404	529·2	545·1	555·7	538·7	0·0076
0·0100	0·009849	0·01015	0·00007854	0·9083	0·8810	0·9355	305·7	314·9	321·0	311·1	0·0100
0·0120	0·01182	0·01218	0·0001131	1·308	1·269	1·347	212·3	218·6	222·9	216·1	0·0120
0·0180	0·01773	0·01827	0·0002545	2·943	2·855	3·031	94·35	97·18	99·06	96·03	0·0180
0·0290	0·02856	0·02943	0·0006605	7·639	7·410	7·868	36·35	37·44	38·16	37·00	0·0290
0·0360	0·03546	0·03654	0·001018	11·77	11·42	12·12	23·59	24·29	24·53	24·01	0·0360
0·0440	0·04333	0·04466	0·001521	17·58	17·06	18·11	15·79	16·26	16·42	16·07	0·0440
0·0520	0·05121	0·05277	0·002124	24·56	23·82	25·30	11·30	11·64	11·76	11·51	0·0520
0·0640	0·06303	0·06495	0·003217	37·20	36·09	38·32	7·463	7·687	7·761	7·596	0·0640
0·0720	0·07091	0·07307	0·004072	47·09	45·67	48·50	5·897	6·074	6·133	6·002	0·0720
0·0830	0·08175	0·08424	0·005411	62·57	60·70	64·45	4·437	4·570	4·615	4·516	0·0830
0·0930	0·09159	0·09438	0·006793	78·56	76·20	80·92	3·534	3·640	3·676	3·597	0·0930
0·1030	0·1014	0·1045	0·008332	96·36	93·47	99·25	2·881	2·968	2·996	2·933	0·1030

TABLE 2.

SOLID AND STRANDED CIRCULAR CONDUCTORS.

(STANDARD ANNEALED COPPER.)

1	2	3	4	5	6	7	8	9
Standard Sizes.		Number and Diameter of Wires comprising Conductor.	Weight per 1,000 yards.		Resistance per 1,000 yards at 60° F.			Standard Sizes.
Nominal Area.	Calculated Area.		Standard.	Minimum Allowable.	Standard.	Maximum Allowable for Plain Wires.	Maximum Allowable for Tinned Wires.	Nominal Area.
Sq. in.	Sq. in.	Inch.	lbs.	lbs.	Ohms.	Ohms.	Ohms.	Sq. in.
0·0010	0·001018	1/·036	11·77	11·42	23·59	24·29	24·53	0·0010
0·0015	0·001521	1/·044	17·58	17·06	15·79	16·26	16·42	0·0015
0·0020	0·001943	3/·029	23·37	22·91	12·36	12·61	12·85	0·0020
0·0030	0·002994	3/·036	36·02	35·30	8·019	8·180	8·260	0·0030
0·0030	0·003217	1/·064	37·20	36·09	7·463	7·687	7·761	0·0030
0·0045	0·004546	7/·029	54·39	53·30	5·281	5·387	5·493	0·0045
0·0070	0·007005	7/·036	83·81	82·14	3·427	3·496	3·530	0·0070
0·0100	0·01046	7/·044	125·2	122·7	2·294	2·340	2·363	0·0100
0·0145	0·01462	7/·052	174·9	171·4	1·643	1·675	1·692	0·0145
0·0225	0·02214	7/·064	264·9	259·6	1·084	1·106	1·117	0·0225
0·0400	0·03960	19/·052	475·5	466·0	0·6063	0·6184	0·6244	0·0400
0·0600	0·05999	19/·064	720·3	705·9	0·4002	0·4082	0·4122	0·0600
0·0750	0·07592	19/·072	911·6	893·4	0·3162	0·3225	0·3257	0·0750
0·1000	0·1009	19/·083	1211	1187	0·2380	0·2427	0·2451	0·1000
0·1200	0·1168	37/·064	1403	1375	0·2056	0·2097	0·2118	0·1200
0·1500	0·1478	37/·072	1776	1741	0·1625	0·1657	0·1673	0·1500
0·2000	0·1964	37/·083	2360	2313	0·1223	0·1247	0·1259	0·2000
0·2500	0·2465	37/·093	2963	2904	0·09738	0·09933	0·1003	0·2500
0·3000	0·3024	37/·103	3635	3562	0·07939	0·08098	0·08177	0·3000
0·4000	0·4064	61/·093	4886	4789	0·05908	0·06026	0·06085	0·4000
0·5000	0·4985	61/·103	5994	5874	0·04816	0·04913	0·04961	0·5000
0·6000	0·6062	91/·093	7290	7144	0·03961	0·04040	0·04079	0·6000
0·7500	0·7435	91/·103	8942	8763	0·03229	0·03294	0·03326	0·7500
1·0000	1·0376	127/·103	12481	12231	0·02314	0·02360	0·02383	1·0000

TABLE 3.
CONDUCTORS FOR FLEXIBLE CORDS.
(STANDARD ANNEALED COPPER.)

1	2	3	4	5
Number of wires in flexible cords. Nominal diameter of each wire 0·0076 inch.				
Nominal Area.	Number and Diameter of Wires comprising Conductor.	Resistance per 1,000 yards at 60° F.		
		Standard.	Maximum Allowable for Plain Wires.	Maximum Allowable for Tinned Wires.
Sq. in.	Inch.	Ohms.	Ohms.	Ohms.
0·0006	14/·0076	39·7	40·5	41·3
0·0010	23/·0076	24·2	24·6	25·1
0·0017	40/·0076	13·9	14·2	14·4
0·0030	70/·0076	7·94	8·10	8·26
0·0048	110/·0076	5·05	5·15	5·25
0·0070	162/·0076	3·43	3·50	3·57

TABLE 4.
NUMBER OF WIRES IN STANDARD CONDUCTORS FOR FLEXIBLE CABLES.
(STANDARD ANNEALED COPPER.)

1	2	3	4	5	6	7	8
Diameter of each wire as at head of column.							
Nominal Area.	Number and Diameter of Wires comprising Conductor.				Resistance per 1,000 yards at 60° F.		
	Nominal diameter 0·010 inch.	Nominal diameter 0·012 inch.	Nominal diameter 0·018 inch.	Nominal diameter 0·029 inch.	Standard.	Maximum Allowable for Plain Wires.	Maximum Allowable for Tinned Wires.
Sq. in.					Ohms.	Ohms.	Ohms.
0·0100	140/·010				2·29	2·34	2·39
0·0145	195/·010		60/·018*		1·64	1·68	1·71
0·0225	296/·010		91/·018*		1·08	1·11	1·13
0·0400		368/·012	163/·018*		0·606	0·618	0·631
0·0600		557/·012	248/·018*		0·400	0·408	0·416
0·0750		705/·012	313/·018	121/·029*	0·316	0·323	0·329
0·1000			416/·018	160/·029*	0·238	0·243	0·247
0·1200			482/·018	186/·029*	0·206	0·210	0·214
0·1500			610/·018	235/·029*	0·163	0·166	0·169
0·2000			810/·018	312/·029*	0·122	0·125	0·127
0·2500			1017/·018	392/·029*	0·0974	0·0993	0·101
0·3000				481/·029	0·0794	0·0810	0·0826
0·4000				646/·029	0·0591	0·0603	0·0614
0·5000				792/·029	0·0482	0·0491	0·0501

* For trailing Cables and similar purposes.

The areas of the Conductors in Table 4 are given in nominal figures, an addition having been made to the number of wires to give resistances as nearly as possible corresponding to those for the same areas in Table 2.

TABLE 5.

660 VOLT PAPER OR JUTE INSULATED CABLES.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7	8	9	10	11	12	13
		Single.	Concentric.	Triple Concentric.	Twin.		Three Core.		Four Core.		Twin Concentric.	
Nominal Area of Conductor.	D. Thickness of Dielectric.	Thickness of Lead.	Thickness of Lead.	Thickness of Lead.	Thickness of Lead on		Thickness of Lead on		Thickness of Lead on		Thickness of Lead on	
					Circular Conductors.	Segmental Conductors.	Circular Conductors.	Segmental Conductors.	Circular Conductors.	Segmental Conductors.	Circular Conductors.	Segmental Conductors.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0070	0·080	0·060	0·070	0·090	0·070	—	0·070	—	0·080	—	—	—
0·0100	0·080	0·060	0·070	0·090	0·070	—	0·070	—	0·080	—	—	—
0·0145	0·080	0·060	0·070	0·090	0·070	0·070	0·080	—	0·090	—	—	—
0·0225	0·080	0·060	0·070	0·090	0·070	0·070	0·080	0·070	0·090	—	0·080	0·070
0·0400	0·080	0·060	0·080	0·090	0·080	0·080	0·090	0·080	0·100	0·090	0·090	0·080
0·0600	0·080	0·070	0·080	0·090	0·080	0·080	0·090	0·080	0·100	0·090	0·090	0·080
0·0750	0·080	0·070	0·080	0·100	0·080	0·080	0·090	0·080	0·100	0·090	0·090	0·080
0·1000	0·080	0·070	0·080	0·100	0·090	0·080	0·100	0·090	0·110	0·100	0·100	0·090
0·1200	0·080	0·070	0·080	0·100	0·090	0·080	0·100	0·090	0·110	0·100	0·110	0·090
0·1500	0·080	0·070	0·080	0·100	0·090	0·080	0·100	0·090	0·110	0·100	0·110	0·090
0·2000	0·080	0·070	0·090	0·110	0·100	0·090	0·110	0·100	0·120	0·110	0·120	0·100
0·2500	0·090	0·080	0·100	0·110	0·110	0·100	0·120	0·110	0·130	0·120	0·120	0·110
0·3000	0·090	0·080	0·100	0·120	0·120	0·110	0·130	0·120	0·140	0·120	0·130	0·120
0·4000	0·100	0·090	0·110	0·130	0·130	0·110	0·140	0·120	0·150	0·130	0·150	0·130
0·5000	0·100	0·090	0·120	0·140	0·140	0·120	0·150	0·130	0·160	0·140	0·160	0·130
0·6000	0·100	0·100	0·130	0·150	—	—	—	—	—	—	—	—
0·7500	0·110	0·100	0·140	0·160	—	—	—	—	—	—	—	—
1·0000	0·110	0·110	0·150	0·170	—	—	—	—	—	—	—	—

D is the thickness of the dielectric between any one Conductor and the next Conductor or the Lead Sheathing.

The Pressure Test (Clause 31) for Paper shall be as follows:—

(*a*) At Works, 2,500 volts for 15 minutes.

(*b*) When laid and jointed, 1,000 volts for 15 minutes.

The Pressure Test (Clause 31) for Jute shall be as follows:—

(*a*) At Works, 1,500 volts for 15 minutes.

(*b*) When laid and jointed, 1,000 volts for 15 minutes.

TABLE 6.

2,200 VOLT PAPER INSULATED CABLES.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7	8	9	10	11	12
Nominal Area of Conductor.	Concentric.				Twin.		Three Core.				
	D.	Not Earthed.	Earthed.		Thickness of Lead on		Centre Point not Earthed.		Centre Point Earthed.		
			Thickness of				Thickness of Lead on		E.	Thickness of Lead on	
	Thickness of Dielectric.	Thickness of Lead.	Outer Dielectric.	Lead.	Circular Conductors.	Segmental Conductors.	Circular Conductors.	Segmental Conductors.	Thickness of Dielectric.	Circular Conductors.	Segmental Conductors.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0225	0·12	0·10	0·08	0·10	0·10	0·10	0·10	0·10	0·10	0·10	0·10
0·0400	0·12	0·10	0·08	0·10	0·10	0·10	0·10	0·10	0·10	0·10	0·10
0·0600	0·12	0·10	0·08	0·10	0·10	0·10	0·10	0·10	0·10	0·10	0·10
0·0750	0·12	0·10	0·08	0·10	0·10	0·10	0·10	0·10	0·10	0·10	0·10
0·1000	0·12	0·10	0·08	0·10	0·10	0·10	0·10	0·10	0·10	0·10	0·10
0·1500	0·12	0·10	0·08	0·10	0·10	0·10	0·11	0·10	0·10	0·11	0·10
0·2000	0·12	0·10	0·08	0·10	0·11	0·10	0·12	0·10	0·10	0·11	0·10
0·2500	0·12	0·10	0·08	0·10	0·12	0·10	0·12	0·11	0·10	0·12	0·11

D is the thickness of the dielectric as follows:—

(1) Concentric Cables, not earthed: Between the Conductors and between the outer Conductor and Lead Sheathing.

(2) Concentric Cables, earthed: Between the Conductors.

(3) Twin Cables: Between the Conductors and between any Conductor and Lead Sheathing.

(4) Three Core Cables, centre point not earthed: Between the Conductors and between any Conductor and Lead Sheathing.

E is the thickness of the dielectric between any Conductor and Lead Sheathing of Three Core Cables when the centre point is earthed.

The Pressure Test (Clause 31) shall be as follows:—

(*a*) At Works, 6,000 volts for 15 minutes. | (*b*) When laid and jointed, 4,000 volts for 15 minutes.

When the centre point of a three-phase system is earthed, the Pressure Test (Clause 31) between any Conductor and earth shall be as follows:—

(*a*) At Works, 3,600 volts for 15 minutes. | (*b*) When laid and jointed, 2,400 volts for 15 minutes.

When the outer Conductor of a Concentric Cable is intended to be earthed, the Pressure Test (Clause 31) between the outer Conductor and earth shall be as follows:—

(*a*) At Works, 2,500 volts for 15 minutes. | (*b*) When laid and jointed, 1,000 volts for 15 minutes.

TABLE 7.

3,300 VOLT PAPER INSULATED CABLES.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7	8	9	10	11	12
		Concentric.			Twin.		Three Core.				
		Not Earthed.	Earthed.				Centre Point not Earthed.		Centre Point Earthed.		
Nominal Area of Conductor.	D.		Thickness of		Thickness of Lead on		Thickness of Lead on		E.	Thickness of Lead on	
	Thickness of Dielectric.	Thickness of Lead.	Outer Dielectric.	Lead.	Circular Conductors.	Segmental Conductors.	Circular Conductors.	Segmental Conductors.	Thickness of Dielectric.	Circular Conductors.	Segmental Conductors.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0225	0·14	0·10	0·09	0·10	0·10	0·10	0·10	0·10	0·11	0·10	0·10
0·0400	0·14	0·10	0·09	0·10	0·10	0·10	0·10	0·10	0·11	0·10	0·10
0·0600	0·14	0·10	0·09	0·10	0·10	0·10	0·10	0·10	0·11	0·10	0·10
0·0750	0·14	0·10	0·09	0·10	0·10	0·10	0·10	0·10	0·11	0·10	0·10
0·1000	0·14	0·10	0·09	0·10	0·10	0·10	0·10	0·10	0·11	0·10	0·10
0·1500	0·14	0·10	0·09	0·10	0·11	0·10	0·11	0·10	0·11	0·11	0·10
0·2000	0·14	0·10	0·09	0·10	0·11	0·10	0·12	0·11	0·11	0·12	0·10
0·2500	0·14	0·11	0·09	0·10	0·12	0·10	0·12	0·11	0·11	0·12	0·11

D is the thickness of the dielectric as follows:—

(1) Concentric Cables, not earthed: Between the Conductors and between the outer Conductor and Lead Sheathing.

(2) Concentric Cables, earthed: Between the Conductors.

(3) Twin Cables: Between the Conductors and between any Conductor and Lead Sheathing.

(4) Three Core Cables, centre point not earthed: Between the Conductors and between any Conductor and Lead Sheathing.

E is the thickness of the dielectric between any Conductor and Lead Sheathing of Three Core Cables when the centre point is earthed.

The Pressure Test (Clause 31) shall be as follows:—

(*a*) At Works, 10,000 volts for 15 minutes. | (*b*) When laid and jointed, 6,000 volts for 15 minutes.

When the centre point of a three-phase system is earthed, the Pressure Test (Clause 31) between any Conductor and earth shall be as follows:—

(*a*) At Works, 6,000 volts for 15 minutes. | (*b*) When laid and jointed, 3,600 volts for 15 minutes.

When the outer Conductor of a Concentric Cable is intended to be earthed, the Pressure Test (Clause 31) between the outer Conductor and earth shall be as follows:—

(*a*) At Works, 2,500 volts for 15 minutes. | (*b*) When laid and jointed, 1,000 volts for 15 minutes.

TABLE 8.

5,500 VOLT PAPER INSULATED CABLES.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7	8	9	10	11	12
		Concentric.			Twin.		Three Core.				
			Earthed.				Centre Point not Earthed.		Centre Point Earthed.		
Nominal Area of Conductor.	D.	Not Earthed.	Thickness of		Thickness of Lead on		Thickness of Lead on		E.	Thickness of Lead on	
	Thickness of Dielectric.	Thickness of Lead.	Outer Dielectric.	Lead.	Circular Conductors.	Segmental Conductors.	Circular Conductors.	Segmental Conductors.	Thickness of Dielectric.	Circular Conductors.	Segmental Conductors.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0225	0·18	0·10	0·09	0·10	0·10	0·10	0·10	0·10	0·14	0·10	0·10
0·0400	0·18	0·10	0·09	0·10	0·10	0·10	0·10	0·10	0·14	0·10	0·10
0·0600	0·18	0·10	0·09	0·10	0·10	0·10	0·10	0·10	0·14	0·10	0·10
0·0750	0·18	0·10	0·09	0·10	0·10	0·10	0·10	0·10	0·14	0·10	0·10
0·1000	0·18	0·10	0·09	0·10	0·10	0·10	0·11	0·10	0·14	0·10	0·10
0·1500	0·18	0·10	0·09	0·10	0·11	0·10	0·12	0·10	0·14	0·11	0·10
0·2000	0·18	0·11	0·09	0·10	0·12	0·10	0·12	0·11	0·14	0·12	0·11
0·2500	0·18	0·11	0·09	0·10	0·12	0·11	0·13	0·12	0·14	0·12	0·11

D is the thickness of the dielectric as follows:—

(1) Concentric Cables, not earthed: Between the Conductors and between the outer Conductor and Lead Sheathing.
(2) Concentric Cables, earthed: Between the Conductors.
(3) Twin Cables: Between the Conductors and between any Conductor and Lead Sheathing.
(4) Three Core Cables, centre point not earthed: Between the Conductors and between any Conductor and Lead Sheathing.

E is the thickness of the dielectric between any Conductor and Lead Sheathing of Three Core Cables when the centre point is earthed.

The Pressure Test (Clause 31) shall be as follows:—

(*a*) At Works, 15,000 volts for 15 minutes. | (*b*) When laid and jointed, 10,000 volts for 15 minutes.

When the centre point of a three-phase system is earthed, the Pressure Test (Clause 31) between any Conductor and earth shall be as follows:—

(*a*) At Works, 9,000 volts for 15 minutes. | (*b*) When laid and jointed, 6,000 volts for 15 minutes.

When the outer Conductor of a Concentric Cable is intended to be earthed, the Pressure Test (Clause 31) between the outer Conductor and earth shall be as follows:—

(*a*) At Works, 2,500 volts for 15 minutes. | (*b*) When laid and jointed, 1,000 volts for 15 minutes.

TABLE 9.

6,600 VOLT PAPER INSULATED CABLES.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7	8	9	10	11	12
		Concentric.			Twin.		Three Core.				
			Earthed.				Centre Point not Earthed.		Centre Point Earthed.		
Nominal Area of Conductor.	D.	Not Earthed.	Thickness of		Thickness of Lead on		Thickness of Lead on		E.	Thickness of Lead on	
	Thickness of Dielectric.	Thickness of Lead.	Outer Dielectric.	Lead.	Circular Conductors.	Segmental Conductors.	Circular Conductors.	Segmental Conductors.	Thickness of Dielectric.	Circular Conductors.	Segmental Conductors.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0225	0·20	0·10	0·10	0·10	0·10	0·10	0·10	0·10	0·15	0·10	0·10
0·0400	0·20	0·10	0·10	0·10	0·10	0·10	0·10	0·10	0·15	0·10	0·10
0·0600	0·20	0·10	0·10	0·10	0·10	0·10	0·10	0·10	0·15	0·10	0·10
0·0750	0·20	0·10	0·10	0·10	0·10	0·10	0·11	0·10	0·15	0·10	0·10
0·1000	0·20	0·10	0·10	0·10	0·11	0·10	0·11	0·10	0·15	0·11	0·10
0·1500	0·20	0·11	0·10	0·10	0·12	0·10	0·12	0·11	0·15	0·12	0·10
0·2000	0·20	0·11	0·10	0·10	0·12	0·10	0·12	0·12	0·15	0·12	0·11
0·2500	0·20	0·12	0·10	0·11	0·13	0·11	0·13	0·12	0·15	0·13	0·12

D is the thickness of the dielectric as follows:—

(1) Concentric Cables, not earthed: Between the Conductors and between the outer Conductor and Lead Sheathing.

(2) Concentric Cables, earthed: Between the Conductors.

(3) Twin Cables: Between the Conductors and between any Conductor and Lead Sheathing.

(4) Three Core Cables, centre point not earthed: Between the Conductors and between any Conductor and Lead Sheathing.

E is the thickness of the dielectric between any Conductor and Lead Sheathing of Three Core Cables when the centre point is earthed.

The Pressure Test (Clause 31) shall be as follows:—

(*a*) At Works, 18,000 volts for 15 minutes. | (*b*) When laid and jointed, 12,000 volts for 15 minutes.

When the centre point of a three-phase system is earthed, the Pressure Test (Clause 31) between any Conductor and earth shall be as follows:—

(*a*) At Works, 10,800 volts for 15 minutes. | (*b*) When laid and jointed, 7,200 volts for 15 minutes.

When the outer Conductor of a Concentric Cable is intended to be earthed, the Pressure Test (Clause 31) between the outer Conductor and earth shall be as follows:—

(*a*) At Works, 2,500 volts for 15 minutes. | (*b*) When laid and jointed, 1,000 volts for 15 minutes.

TABLE 10.

11,000 VOLT PAPER INSULATED CABLES.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7	8	9	10	11	12
		Concentric.			Twin.		Three Core.				
			Earthed.				Centre Point not Earthed.		Centre Point Earthed.		
Nominal Area of Conductor.	D.	Not Earthed.	Thickness of		Thickness of Lead on		Thickness of Lead on		E.	Thickness of Lead on	
	Thickness of Dielectric.	Thickness of Lead.	Outer Dielectric.	Lead.	Circular Conductors.	Segmental Conductors.	Circular Conductors.	Segmental Conductors.	Thickness of Dielectric.	Circular Conductors.	Segmental Conductors.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0225	0·30	0·11	0·11	0·10	0·10	0·10	0·10	0·10	0·21	0·10	0·10
0·0400	0·30	0·11	0·11	0·10	0·11	0·10	0·11	0·11	0·21	0·10	0·10
0·0600	0·30	0·12	0·11	0·10	0·11	0·10	0·11	0·11	0·21	0·11	0·10
0·0750	0·30	0·12	0·11	0·10	0·12	0·10	0·12	0·12	0·21	0·11	0·11
0·1000	0·30	0·12	0·11	0·10	0·12	0·11	0·12	0·12	0·21	0·12	0·11
0·1500	0·30	0·12	0·11	0·11	0·13	0·11	0·13	0·12	0·21	0·12	0·11
0·2000	0·30	0·13	0·11	0·11	0·13	0·12	0·14	0·13	0·21	0·13	0·12
0·2500	0·30	0·13	0·11	0·12	0·14	0·12	0·15	0·13	0·21	0·14	0·12

D is the thickness of the dielectric as follows :—

(1) Concentric Cables, not earthed : Between the Conductors and between the outer Conductor and Lead Sheathing.

(2) Concentric Cables, earthed : Between the Conductors.

(3) Twin Cables : Between the Conductors and between any Conductor and Lead Sheathing.

(4) Three Core Cables, centre point not earthed : Between the Conductors and between any Conductor and Lead Sheathing.

E is the thickness of the dielectric between any Conductor and Lead Sheathing of Three Core Cables when the centre point is earthed.

The Pressure Test (Clause 31) shall be as follows :—

(*a*) At Works, 25,000 volts for 15 minutes. | (*b*) When laid and jointed, 20,000 volts for 15 minutes.

When the centre point of a three-phase system is earthed, the Pressure Test (Clause 31) between any Conductor and earth shall be as follows :—

(*a*) At Works, 15,000 volts for 15 minutes. | (*b*) When laid and jointed, 12,000 volts for 15 minutes.

When the outer Conductor of a Concentric Cable is intended to be earthed, the Pressure Test (Clause 31) between the outer Conductor and earth shall be as follows :—

(*a*) At Works, 2,500 volts for 15 minutes. | (*b*) When laid and jointed, 1,000 volts for 15 minutes.

TABLE 11.

RUBBER INSULATED CABLES FOR:—

(*a*) Direct current systems for pressures not varying from earth potential by more than 250 volts.

(*b*) Three-phase systems, with centre point earthed, for pressures not more than 500 volts between phases.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7
Nominal Area of Conductor.	Number and Diameter of Wires.	D. Thickness of Dielectric.	Thickness of Lead.			
			Single.	Concentric.	Twin (flat or round).	Three Core.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0010	1/·036	0·034	0·040	0·040	0·040	0·050
0·0015	1/·044	0·034	0·040	0·040	0·040	0·050
0·0020	3/·029	0·036	0·040	0·040	0·040	0·050
0·0030	3/·036	0·038	0·040	0·040	0·040	0·050
0·0030	1/·064	0·036	0·040	0·040	0·040	0·050
0·0045	7/·029	0·039	0·040	0·050	0·050	0·060
0·0070	7/·036	0·041	0·050	0·050	0·050	0·060
0·0100	7/·044	0·043	0·050	0·050	0·050	0·070
0·0145	7/·052	0·046	0·060	0·060	0·060	0·070
0·0225	7/·064	0·049	0·060	0·060	0·060	0·070
0·0400	19/·052	0·056	0·060	0·080	0·080	0·090
0·0600	19/·064	0·062	0·070	0·080	0·080	0·090
0·0750	19/·072	0·066	0·070	0·080	0·080	0·090
0·1000	19/·083	0·072	0·070	0·090	0·090	0·100
0·1200	37/·064	0·075	0·070	0·090	0·090	0·100
0·1500	37/·072	0·080	0·080	0·090	0·090	0·100
0·2000	37/·083	0·088	0·080	0·100	0·100	0·110
0·2500	37/·093	0·095	0·090	0·110	0·110	0·120
0·3000	37/·103	0·102	0·090	0·120	0·120	0·130
0·4000	61/·093	0·114	0·100	0·130	0·130	0·140
0·5000	61/·103	0·121	0·110	0·140	0·140	0·150
0·6000	91/·093	0·125	0·110	—	—	—
0·7500	91/·103	0·131	0·120	—	—	—
1·0000	127/·103	0·141	0·120	—	—	—

D is the thickness of the dielectric as follows:—

(1) On the Conductor of single Conductor Cable.

(2) On each Conductor of Concentric Cable.

(3) On each core of twin and three-core Cables.

The Pressure Test (Clause 31) at Works shall be 1,000 volts for 15 minutes.

The Pressure Test (Clause 31) when the Cable is laid underground and jointed shall be 500 volts for 15 minutes.

When the Cable is intended to be laid underground the minimum thickness of the Lead Sheathing shall be 0·060 inch.

TABLE 12.

RUBBER INSULATED CABLES FOR:—

Pressures not varying from earth potential by more than 660 volts.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7
Nominal Area of Conductor.	Number and Diameter of Wires.	D. Thickness of Dielectric.	Thickness of Lead.			
			Single.	Concentric.	Twin.	Three Core.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0010	1/·036	0·055	0·050	0·050	0·050	0·060
0·0015	1/·044	0·055	0·050	0·050	0·050	0·060
0·0020	3/·029	0·056	0·050	0·050	0·050	0·060
0·0030	3/·036	0·057	0·050	0·050	0·050	0·060
0·0030	1/·064	0·057	0·050	0·050	0·050	0·060
0·0045	7/·029	0·058	0·050	0·060	0·060	0·070
0·0070	7/·036	0·059	0·060	0·060	0·060	0·070
0·0100	7/·044	0·060	0·060	0·060	0·060	0·080
0·0145	7/·052	0·061	0·060	0·070	0·070	0·080
0·0225	7/·064	0·062	0·060	0·070	0·070	0·080
0·0400	19/·052	0·063	0·060	0·080	0·080	0·090
0·0600	19/·064	0·065	0·070	0·080	0·080	0·090
0·0750	19/·072	0·066	0·070	0·080	0·080	0·090
0·1000	19/·083	0·072	0·070	0·090	0·090	0·100
0·1200	37/·064	0·075	0·070	0·090	0·090	0·100
0·1500	37/·072	0·080	0·080	0·090	0·090	0·100
0·2000	37/·083	0·088	0·080	0·100	0·100	0·110
0·2500	37/·093	0·095	0·090	0·110	0·110	0·120
0·3000	37/·103	0·102	0·090	0·120	0·120	0·130
0·4000	61/·093	0·114	0·100	0·130	0·130	0·140
0·5000	61/·103	0·121	0·110	0·140	0·140	0·150
0·6000	91/·093	0·125	0·110	—	—	—
0·7500	91/·103	0·131	0·120	—	—	—
1·0000	127/·103	0·141	0·120	—	—	—

D is the thickness of the dielectric as follows:—

(1) On the Conductor of single Conductor Cable.
(2) On each Conductor of Concentric Cable.
(3) On each core of twin and three-core Cables.

The Pressure Test (Clause 31) at Works shall be 2,500 volts for 15 minutes.

The Pressure Test (Clause 31) when the Cable is laid underground and jointed shall be 1,200 volts for 15 minutes.

When the Cable is intended to be laid underground the minimum thickness of the Lead Sheathing shall be 0·060 inch.

TABLE 13.

2,200 VOLT RUBBER INSULATED CABLE.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7
		Single.	Concentric.		Twin.	Three Core.
Nominal Area of Conductor.	D. Thickness of Dielectric.	Thickness of				
		Lead.	Outer Dielectric.	Lead.	Lead.	Lead.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0225	0·12	0·07	0·08	0·08	0·08	0·09
0·0400	0·12	0·07	0·08	0·09	0·09	0·10
0·0600	0·12	0·08	0·08	0·09	0·09	0·10
0·0750	0·12	0·08	0·08	0·09	0·09	0·10
0·1000	0·12	0·08	0·08	0·10	0·10	0·11
0·1500	0·12	0·09	0·08	0·10	0·10	0·11
0·2000	0·12	0·09	0·08	0·11	0·11	0·12
0·2500	0·12	0·10	0·08	0·12	0·12	0·13

D is the thickness of the dielectric as follows :—

(1) On the Conductor of single Conductor Cable.
(2) On each Conductor of Concentric Cable, except for the outer dielectric of an earthed Concentric Cable. In this case the thickness of the dielectric is that given in column 4 of the above Table.
(3) On each core of twin and three-core Cables.

The Pressure Test (Clause 31) shall be as follows :—

(*a*) At Works, 6,000 volts for 15 minutes.
(*b*) When laid and jointed, 4,000 volts for 15 minutes.

When the centre point of a three-phase system is earthed, the Pressure Test (Clause 31) between any Conductor and earth shall be as follows :—

(*a*) At Works, 3,600 volts for 15 minutes.
(*b*) When laid and jointed, 2,400 volts for 15 minutes.

When the outer Conductor of a Concentric Cable is intended to be earthed, the Pressure Test (Clause 31) between the outer Conductor and earth shall be as follows :—

(*a*) At Works, 2,500 volts for 15 minutes.
(*b*) When laid and jointed, 1,000 volts for 15 minutes.

TABLE 14.

3,300 VOLT RUBBER INSULATED CABLE.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7
		Single.	Concentric.		Twin.	Three Core.
Nominal Area of Conductor.	D. Thickness of Dielectric.	Thickness of				
		Lead.	Outer Dielectric.	Lead.	Lead.	Lead.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0225	0·14	0·07	0·09	0·08	0·08	0·09
0·0400	0·14	0·07	0·09	0·09	0·09	0·10
0·0600	0·14	0·08	0·09	0·09	0·09	0·10
0·0750	0·14	0·08	0·09	0·09	0·09	0·10
0·1000	0·14	0·08	0·09	0·10	0·10	0·11
0·1500	0·14	0·09	0·09	0·10	0·10	0·11
0·2000	0·14	0·09	0·09	0·11	0·11	0·12
0·2500	0·14	0·10	0·09	0·12	0·12	0·13

D is the thickness of the dielectric as follows:—

(1) On the Conductor of single Conductor Cable.
(2) On each Conductor of Concentric Cable, except for the outer dielectric of an earthed Concentric Cable. In this case the thickness of the dielectric is that given in column 4 of the above Table.
(3) On each core of twin and three-core Cables.

The Pressure Test (Clause 31) shall be as follows:—

(*a*) At Works, 10,000 volts for 15 minutes.
(*b*) When laid and jointed, 6,000 volts for 15 minutes.

When the centre point of a three-phase system is earthed, the Pressure Test (Clause 31) between any Conductor and earth shall be as follows:—

(*a*) At Works, 6,000 volts for 15 minutes.
(*b*) When laid and jointed, 3,600 volts for 15 minutes.

When the outer Conductor of a Concentric Cable is intended to be earthed, the Pressure Test (Clause 31) between the outer Conductor and earth shall be as follows:—

(*a*) At Works, 2,500 volts for 15 minutes.
(*b*) When laid and jointed, 1,000 volts for 15 minutes.

TABLE 15.

5,500 VOLT RUBBER INSULATED CABLE.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7
		Single.	Concentric.		Twin.	Three Core.
Nominal Area of Conductor.	D. Thickness of Dielectric.	Thickness of				
		Lead.	Outer Dielectric.	Lead.	Lead.	Lead.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0225	0·18	0·07	0·09	0·08	0·08	0·09
0·0400	0·18	0·07	0·09	0·09	0·09	0·10
0·0600	0·18	0·08	0·09	0·09	0·09	0·10
0·0750	0·18	0·08	0·09	0·09	0·09	0·10
0·1000	0·18	0·08	0·09	0·10	0·10	0·11
0·1500	0·18	0·09	0·09	0·10	0·10	0·11
0·2000	0·18	0·09	0·09	0·11	0·11	0·12
0·2500	0·18	0·10	0·09	0·12	0·12	0·13

D is the thickness of the dielectric as follows:—

(1) On the Conductor of single Conductor Cable.
(2) On each Conductor of Concentric Cable, except for the outer dielectric of an earthed Concentric Cable. In this case the thickness of the dielectric is that given in column 4 of the above Table.
(3) On each core of twin and three-core Cables.

The Pressure Test (Clause 31) shall be as follows:—

(*a*) At Works, 15,000 volts for 15 minutes.
(*b*) When laid and jointed, 10,000 volts for 15 minutes.

When the centre point of a three-phase syetem is earthed, the Pressure Test (Clause 31) between any Conductor and earth shall be as follows:—

(*a*) At Works, 9,000 volts for 15 minutes.
(*b*) When laid and jointed, 6,000 volts for 15 minutes.

When the outer Conductor of a Concentric Cable is intended to be earthed, the Pressure Test (Clause 31) between the outer Conductor and earth shall be as follows:—

At Works, 2,500 volts for 15 minutes.
When laid and jointed, 1,000 volts for 15 minutes.

TABLE 16.

6,600 VOLT RUBBER INSULATED CABLE.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7
		Single.	Concentric.		Twin.	Three Core.
Nominal Area of Conductor.	D. Thickness of Dielectric.	Thickness of				
		Lead.	Outer Dielectric.	Lead.	Lead.	Lead.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0225	0·20	0·08	0·10	0·10	0·10	0·11
0·0400	0·20	0·08	0·10	0·10	0·10	0·11
0·0600	0·20	0·09	0·10	0·10	0·10	0·11
0·0750	0·20	0·09	0·10	0·10	0·10	0·11
0·1000	0·20	0·09	0·10	0·11	0·11	0·12
0·1500	0·20	0·10	0·10	0·11	0·11	0·12
0·2000	0·20	0·10	0·10	0·12	0·12	0·13
0·2500	0·20	0·11	0·10	0·13	0·13	0·14

D is the thickness of the dielectric as follows :—

(1) On the Conductor of single Conductor Cable.
(2) On each Conductor of Concentric Cable, except for the outer dielectric of an earthed Concentric Cable. In this case the thickness of the dielectric is that given in column 4 of the above Table.
(3) On each core of twin and three-core Cables.

The Pressure Test (Clause 31) shall be as follows :—

(*a*) At Works, 18,000 volts for 15 minutes.
(*b*) When laid and jointed, 12,000 volts for 15 minutes.

When the centre point of a three-phase system is earthed, the Pressure Test (Clause 31) between any Conductor and earth shall be as follows :—

(*a*) At Works, 10,800 volts for 15 minutes.
(*b*) When laid and jointed, 7,200 volts for 15 minutes.

When the outer Conductor of a Concentric Cable is intended to be earthed, the Pressure Test (Clause 31) between the outer Conductor and earth shall be as follows :—

(*a*) At Works, 2,500 volts for 15 minutes.
(*b*) When laid and jointed, 1,000 volts for 15 minutes.

TABLE 17.

11,000 VOLT RUBBER INSULATED CABLE.

THICKNESSES OF DIELECTRIC AND LEAD SHEATHING.

1	2	3	4	5	6	7
		Single.	Concentric.		Twin.	Three Core.
Nominal Area of Conductor.	D. Thickness of Dielectric.	Thickness of				
		Lead.	Outer Dielectric.	Lead.	Lead.	Lead.
Sq. in.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
0·0225	0·30	0·08	0·11	0·10	0·10	0·11
0·0400	0·30	0·08	0·11	0·10	0·10	0·11
0·0600	0·30	0·09	0·11	0·10	0·10	0·11
0·0750	0·30	0·09	0·11	0·10	0·10	0·11
0·1000	0·30	0·09	0·11	0·11	0·11	0·12
0·1500	0·30	0·10	0·11	0·11	0·11	0·12
0·2000	0·30	0·10	0·11	0·12	0·12	0·13
0·2500	0·30	0·11	0·11	0·13	0·13	0·14

D is the thickness of the dielectric as follows:—

(1) On the Conductor of single Conductor Cable.
(2) On each Conductor of Concentric Cable, except for the outer dielectric of an earthed Concentric Cable. In this case the thickness of the dielectric is that given in column 4 of the above Table.
(3) On each core of twin and three-core Cables.

The Pressure Test (Clause 31) shall be as follows:—

(*a*) At Works, 25,000 volts for 15 minutes.
(*b*) When laid and jointed, 20,000 volts for 15 minutes.

When the centre point of a three-phase system is earthed, the Pressure Test (Clause 31) between any Conductor and earth shall be as follows:—

(*a*) At Works, 15,000 volts for 15 minutes.
(*b*) When laid and jointed, 12,000 volts for 15 minutes.

When the outer Conductor of a Concentric Cable is intended to be earthed, the Pressure Test (Clause 31) between the outer Conductor and earth shall be as follows:—

(*a*) At Works, 2,500 volts for 15 minutes.
(*b*) When laid and jointed, 1,000 volts for 15 minutes.

THICKNESSES OF ARMOURING, BEDDING, BRAIDING AND SERVING.

TABLE 18.

SIZES OF GALVANISED WIRES AND THICKNESSES OF BEDDING FOR SINGLE WIRE ARMOURING.

Diameter of Cable to be Armoured exclusive of Bedding.		Size of Galvanised Wire.	Thickness of Bedding.
Above.	Up to and including.	Diameter.	
Inch.	Inch.	Inch.	Inch.
—	0·40	0·064	0·040
0·40	0·80	0·072	0·060
0·80	1·05	0·080	0·100
1·05	1·30	0·104	0·100
1·30	1·60	0·128	0·100
1·60	2·00	0·160	0·100
2·00	3·00	0·192	0·100

TABLE 19.

SIZES OF GALVANISED WIRES AND THICKNESSES OF BEDDING FOR DOUBLE WIRE ARMOURING.

Diameter of Cable to be Armoured exclusive of Bedding.		Size of Galvanised Wire in each layer.	Thickness of Bedding.
Above.	Up to and including.	Diameter.	
Inch.	Inch.	Inch.	Inch.
—	0·40	0·056	0·040
0·40	0·80	0·064	0·060
0·80	1·05	0·072	0·100
1·05	1·30	0·080	0·100
1·30	1·60	0·104	0·100
1·60	2·00	0·128	0·100
2·00	3·00	0·160	0·100

TABLE 20.

THICKNESSES OF STEEL TAPE AND BEDDING.

Diameter of Cable to be Armoured exclusive of Bedding.		Thickness of Steel Tape.	Thickness of Bedding.
Above.	Up to and including.		
Inch.	Inch.	Inch.	Inch.
0·50	0·75	0·030	0·060
0·75	2·00	0·040	0·100
2·00	—	0·060	0·100

TABLE 21.

THICKNESSES OF OVERALL BRAIDING AND SERVING.

Diameter of Cable.		Thickness in the finished Cable of	
Above.	Up to and including.	Braiding.	Serving.
Inch.	Inch.	Inch.	Inch.
—	0·80	0·045	0·060
0·80	—	0·060	0·100

British Engineering Standards Association.

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OF

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JULY, 1919.

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